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## PD84008L-E

RF power transistor, LdmoST plastic family  
N-channel enhancement-mode lateral MOSFETs

### Features

- Excellent thermal stability
- Common source configuration
- $P_{OUT} = 8\text{ W}$  with 13 dB gain @ 870 MHz / 7.5 V
- Plastic package
- ESD protection
- In compliance with the 2002/95/EC european directive

### Description

The PD84008L-E is a common source N-channel, enhancement-mode lateral Field-Effect RF power transistor. It is designed for high gain, broadband commercial and industrial applications. It operates at 7.5 V in common source mode at frequencies of up to 1 GHz. PD84008L-E boasts the excellent gain, linearity and reliability of ST's latest LDMOS technology mounted in leadless SMD plastic RF power package, PowerFLAT™.

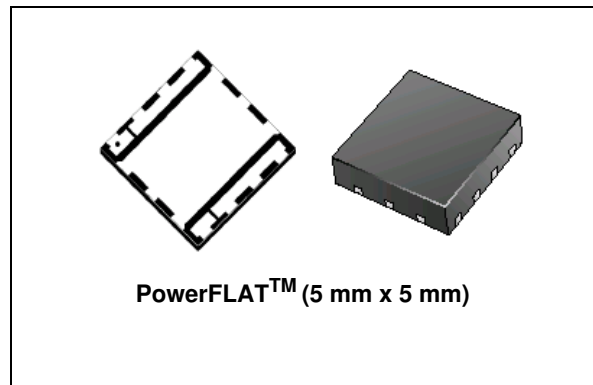


Figure 1. Pin connection

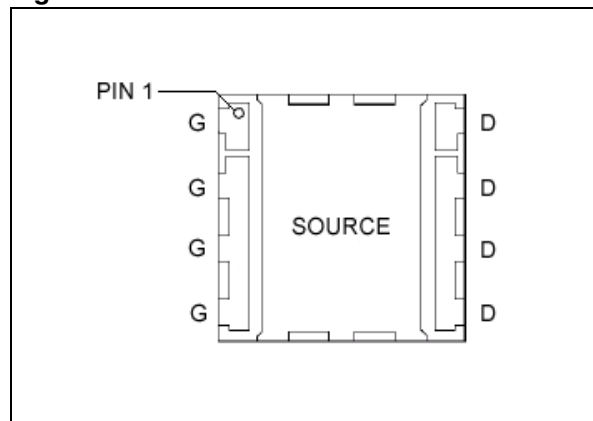


Table 1. Device summary

Order code	Marking	Package	Packing
PD84008L-E	84008	PowerFLAT™	Tape and reel

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# 1 Electrical data

## 1.1 Maximum ratings

Table 2. Absolute maximum ratings ( $T_{CASE} = 25^{\circ}C$ )

Symbol	Parameter	Value	Unit
$V_{(BR)DSS}$	Drain-source voltage	25	V
$V_{GS}$	Gate-source voltage	-0.5 to +15	V
$I_D$	Drain current	7	A
$P_{DISS}$	Power dissipation (@ $T_C = 70^{\circ}C$ )	26.7	W
$T_J$	Max. operating junction temperature	150	$^{\circ}C$
$T_{STG}$	Storage temperature	-65 to +150	$^{\circ}C$

## 1.2 Thermal data

Table 3. Thermal data

Symbol	Parameter	Value	Unit
$R_{thJC}$	Junction - case thermal resistance	3	$^{\circ}C/W$

## 2 Electrical characteristics

$T_{CASE} = +25\text{ }^{\circ}\text{C}$

### 2.1 Static

**Table 4. Static**

Symbol	Test conditions			Min	Typ	Max	Unit
$I_{DSS}$	$V_{GS} = 0\text{ V}$	$V_{DS} = 25\text{ V}$				1	$\mu\text{A}$
$I_{GSS}$	$V_{GS} = 5\text{ V}$	$V_{DS} = 0\text{ V}$				1	$\mu\text{A}$
$V_{GS(Q)}$	$V_{DS} = 10\text{ V}$	$I_D = 250\text{mA}$		3.2		4.8	V
$V_{DS(ON)}$	$V_{GS} = 10\text{ V}$	$I_D = 1\text{ A}$			0.27	0.31	V
$C_{ISS}$	$V_{GS} = 0\text{ V}$	$V_{DS} = 7\text{ V}$	$f = 1\text{ MHz}$		57		pF
$C_{OSS}$	$V_{GS} = 0\text{ V}$	$V_{DS} = 7\text{ V}$	$f = 1\text{ MHz}$		46		pF
$C_{RSS}$	$V_{GS} = 0\text{ V}$	$V_{DS} = 7\text{ V}$	$f = 1\text{ MHz}$		2		pF

### 2.2 Dynamic

**Table 5. Dynamic**

Symbol	Test conditions			Min	Typ	Max	Unit
P3dB	$V_{DD} = 7.5\text{ V}$ , $I_{DQ} = 250\text{ mA}$	$f = 870\text{ MHz}$		8	9		W
$G_P$	$V_{DD} = 7.5\text{ V}$ , $I_{DQ} = 250\text{ mA}$ , $P_{OUT} = 2\text{ W}$ , $f = 870\text{ MHz}$			13	15.5		dB
$h_D$	$V_{DD} = 7.5\text{ V}$ , $I_{DQ} = 250\text{ mA}$ , $P_{OUT} = P_{3dB}$ , $f = 870\text{ MHz}$			50	57		%
Load mismatch	$V_{DD} = 9.5\text{ V}$ , $I_{DQ} = 250\text{ mA}$ , $P_{OUT} = 10\text{ W}$ , $f = 870\text{ MHz}$ All phase angles			20:1			VSWR

### 2.3 ESD protection characteristics

**Table 6. ESD protection characteristics**

Test conditions	Class
Human body model	2
Machine model	M3

### 2.4 Moisture sensitivity level

**Table 7. Moisture sensitivity level**

Test methodology	Rating
J-STD-020B	MSL 3

### 3 Impedance

Figure 2. Current conventions

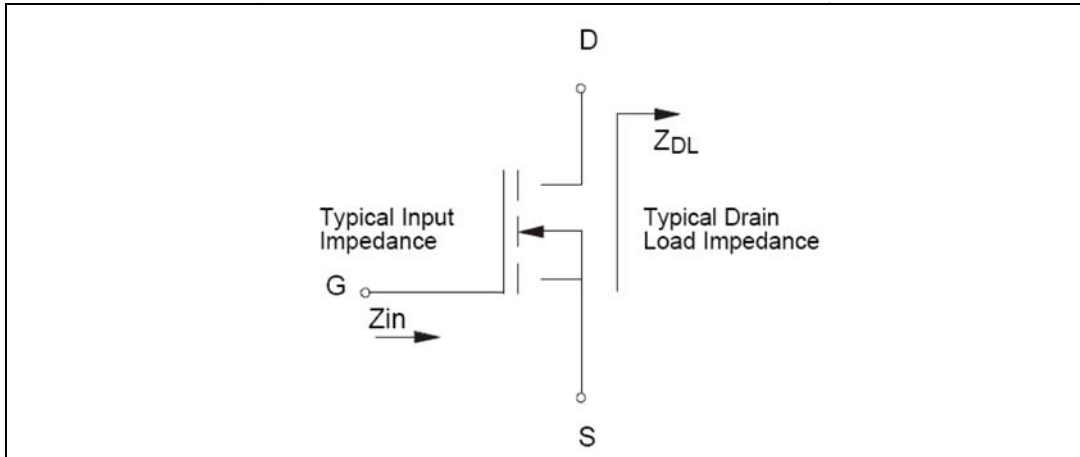


Table 8. Impedance data

Freq. (MHz)	$Z_{IN}$ ( $\Omega$ )	$Z_{DL}$ ( $\Omega$ )
870 MHz	TBD	TBD



## 4 Typical performance

Figure 3. Capacitances vs drain voltage

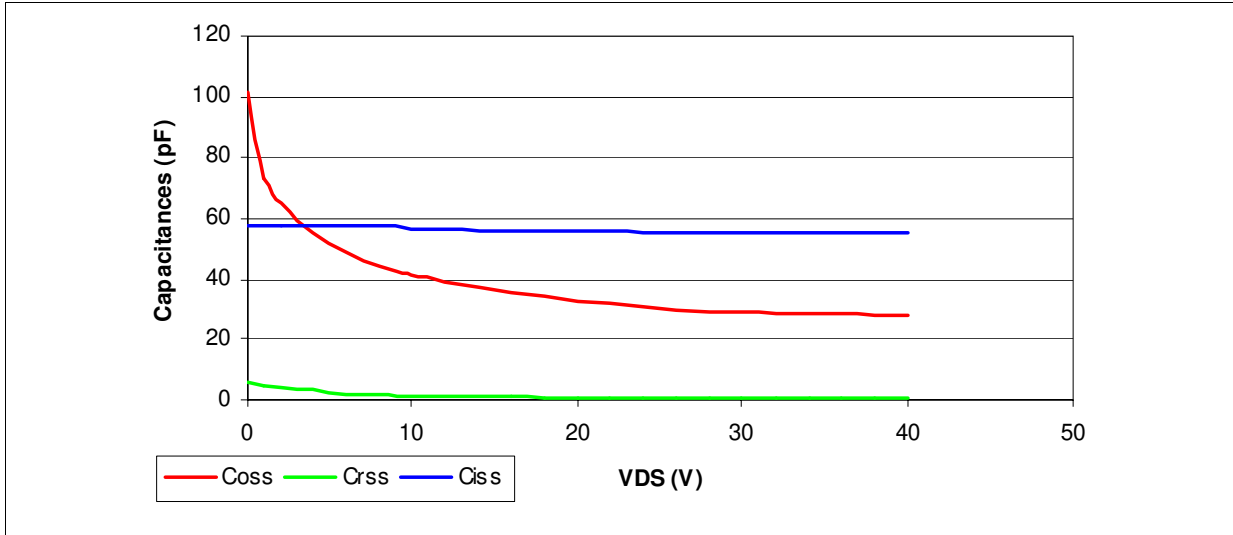


Figure 4. DC output characteristics

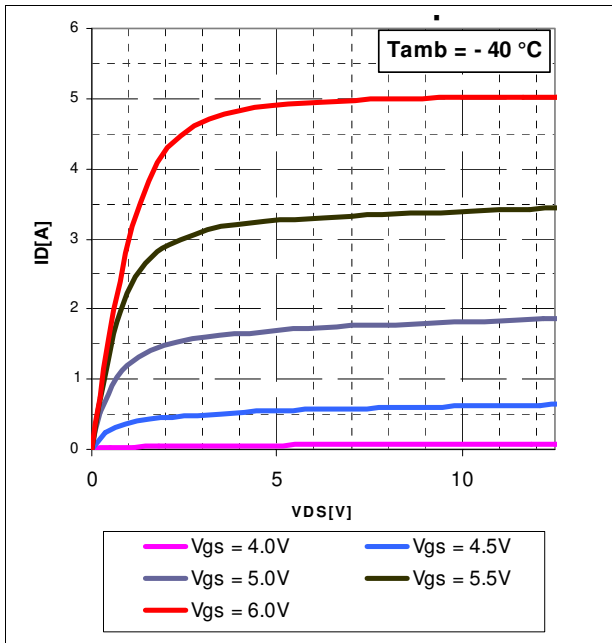


Figure 5. DC output characteristics

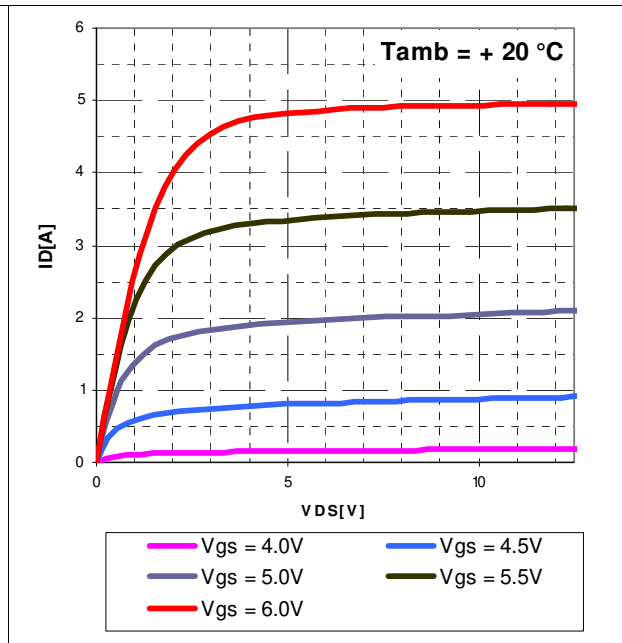


Figure 6. DC output characteristics

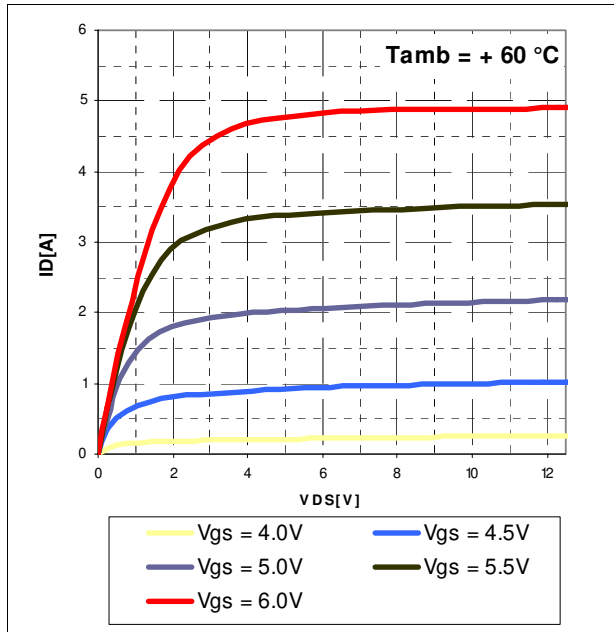


Figure 7. Output power and drain current vs gate voltage

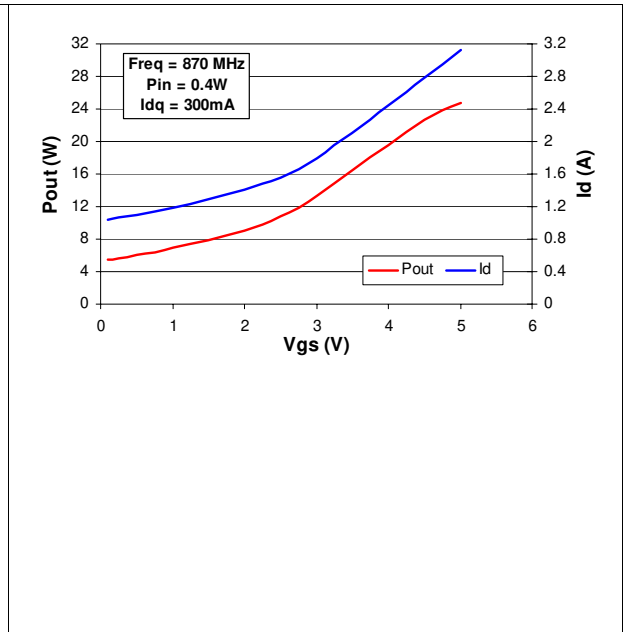


Figure 8. Output power vs supply voltage and input power

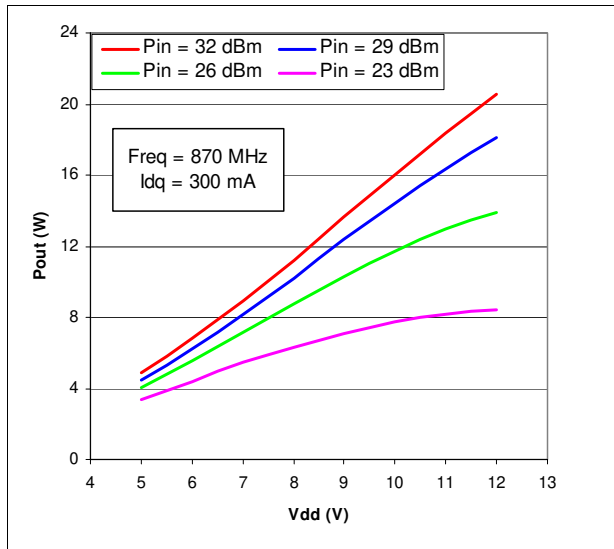


Figure 9. Gain and efficiency vs output power

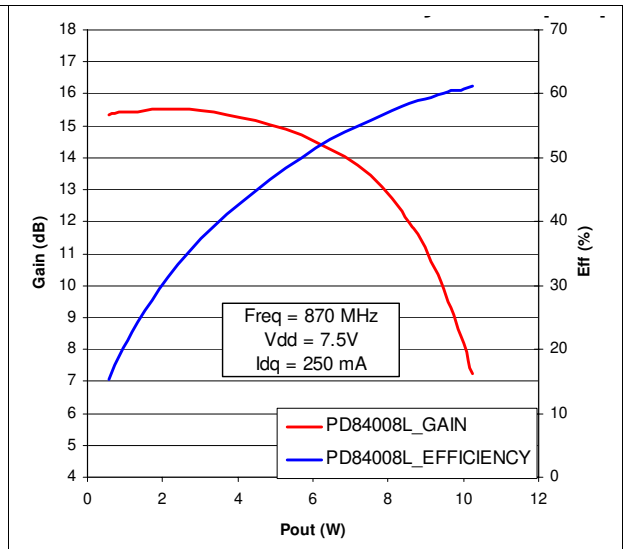
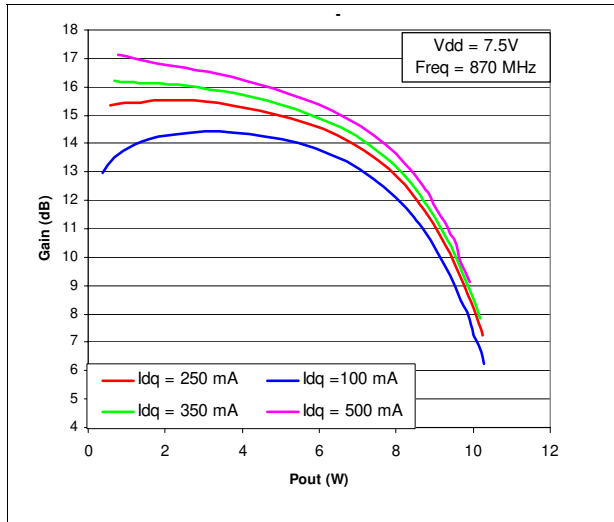




Figure 10. Gain vs output power and bias current



## 5 Package mechanical data

In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK® packages, depending on their level of environmental compliance. ECOPACK® specifications, grade definitions and product status are available at: [www.st.com](http://www.st.com). ECOPACK is an ST trademark.

**Table 9. PowerFLAT™ (5x5) mechanical data**

Dim.	mm			inch		
	Min	Typ	Max	Min	Typ	Max
A		0.90	1.00		0.035	0.039
A1		0.02	0.05		0.001	0.002
A3		0.24			0.009	
AA	0.15	0.25	0.35	0.006	0.01	0.014
b	0.43	0.51	0.58	0.017	0.020	0.023
c	0.64	0.71	0.79	0.025	0.028	0.031
D		5.00			0.197	
d		0.30			0.011	
E		5.00			0.197	
E2	2.49	2.57	2.64	0.098	0.101	0.104
e		1.27			0.050	
f		3.37			0.132	
g		0.74			0.03	
h		0.21			0.008	

**Figure 11. PowerFLAT™ (5x5) package dimensions**

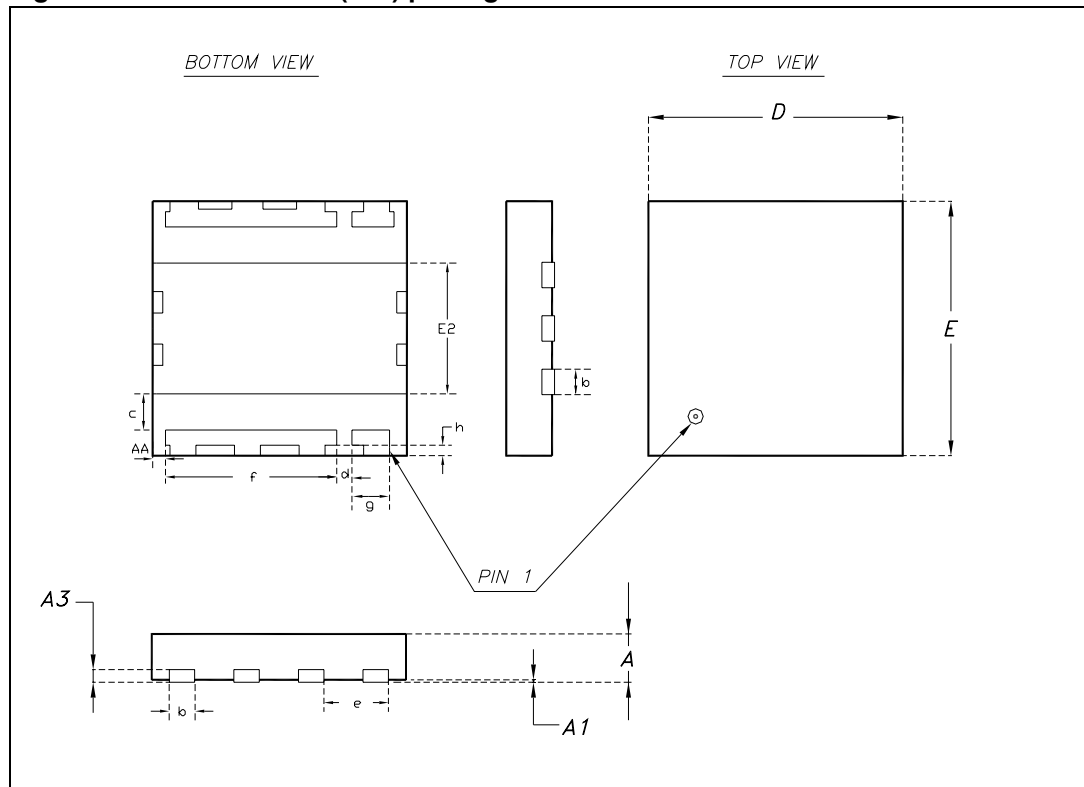


Table 10. Tape and reel dimensions

Dim.	Mm		
	Min	Typ	Max
Ao	5.15	5.25	5.35
Bo	5.15	5.25	5.35
Ko	1.0	1.1	1.2

Figure 12. Tape and reel dimensions

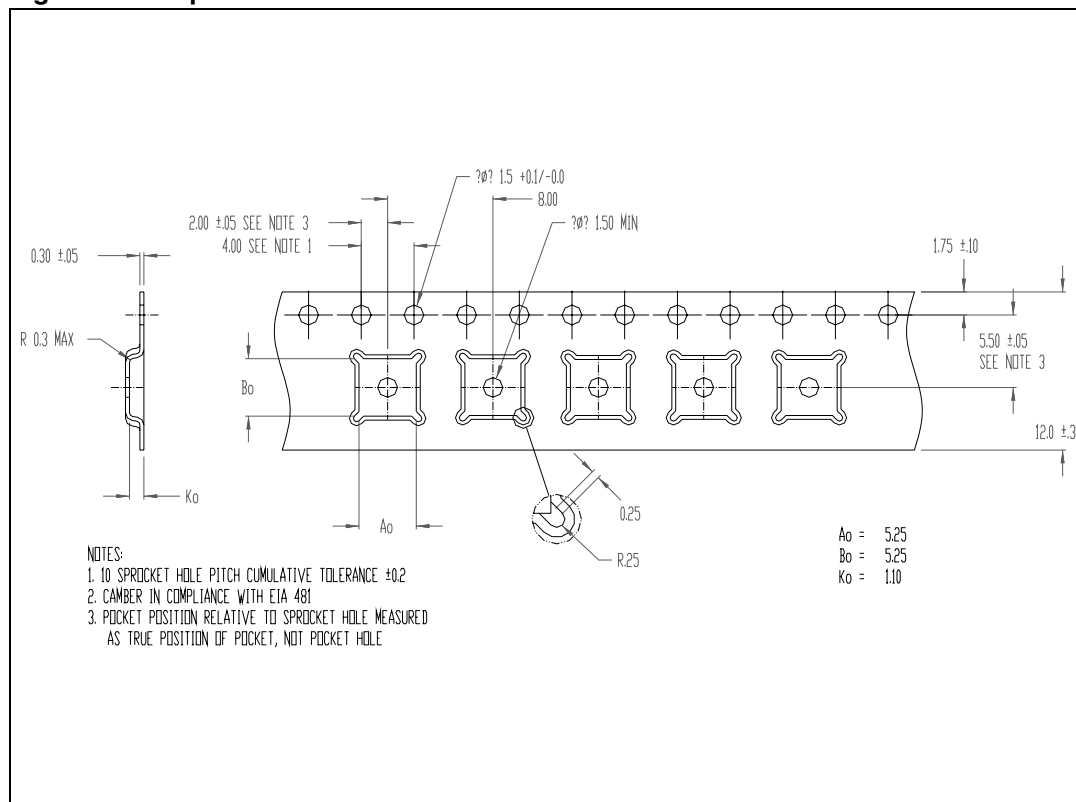
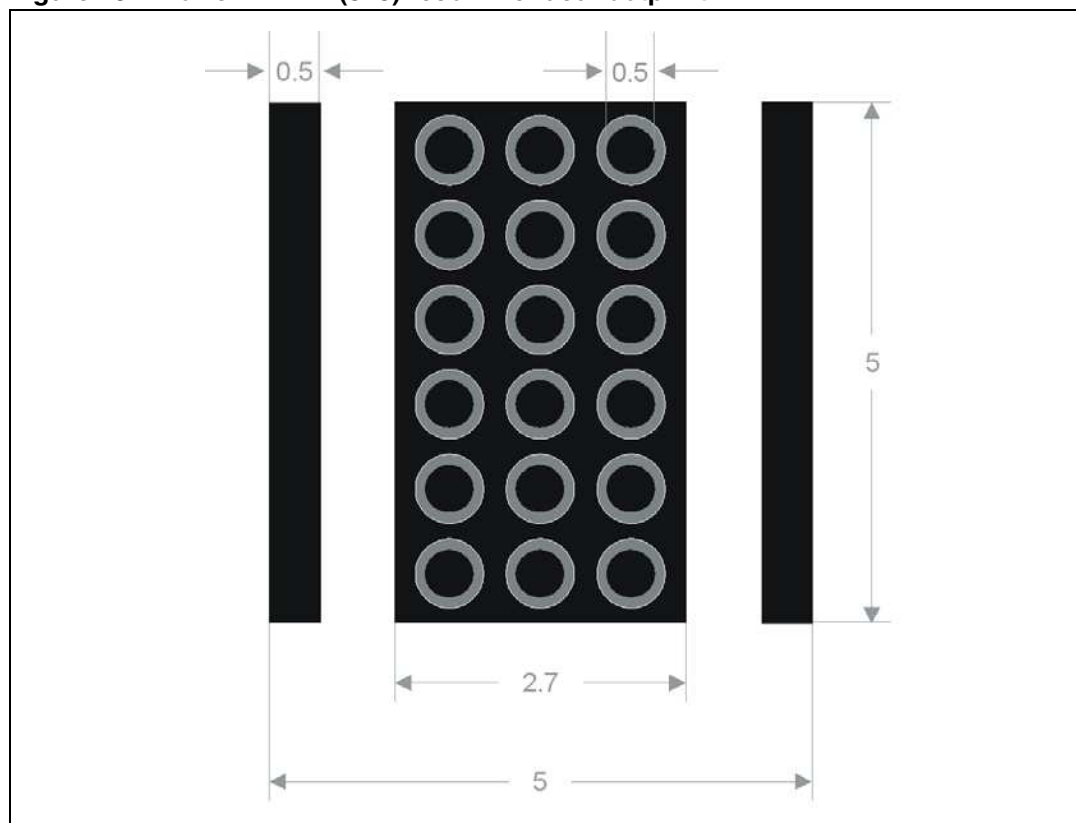


Figure 13. PowerFLAT™ (5x5) recommended footprint



## 6 Revision history

**Table 11. Document revision history**

Date	Revision	Changes
05-Dec-2007	1	Initial release.
05-Mar-2008	2	Updated <a href="#">Table 4 on page 4</a> .
15-Feb-2011	3	Updated <a href="#">Table 4 on page 4</a>

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